MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2015/2016

PBM0045 – MATHEMATICS

(Foundation in Management / Foundation in Business)

31 May 2016
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 3 pages with **FOUR** questions.

2. Attempt **ALL** four questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

Question 1

a. Simplify the following expressions:

i. $$\frac{\left(5d^3ef^2\right)^2\left(d^{-4}e^{-3}\right)^3}{\left(25d^{-4}\right)\left(e^2f^{-3}\right)^4}$$ (3 marks)

ii. $$\frac{\dfrac{6}{x^2+2x-15}-\dfrac{1}{x-3}}{\dfrac{1}{x+5}+1}$$ (5 marks)

b. Solve the following functions:

i. $\sqrt{x+7}+\sqrt{x}=7$ (6 marks)

ii. $\dfrac{2x-1}{8} \le -2-\dfrac{x+3}{4}$ (4 marks)

c. Given the function $f(x)=3-\sqrt{1+x}$. Sketch the graph of $y=f(x)$. (7 marks)

(Total = 25 marks)

Question 2

a. Which of the following choices, ***A*** or ***B***, results in more money?
(All necessary workings must be shown and state your final decision.)

A: To receive RM1000 on day 1, RM999 on day 2, RM998 on day 3, with the process to end after 1000 days.

B: To receive RM1 on day 1, RM2 on day 2, RM4 on day 3, for 19 days.

(7 marks)

b. In a geometric progression, the third term is 48 and the sixth term is 162. Find the first term and the common ratio. (5 marks)

Continued...

c. Solve the following system of linear equations using the inverse of coefficient matrix.

$$\begin{aligned} x+4y-3z+8&=0\\ 3x-y+3z-12&=0\\ x+y+6z-1&=0 \end{aligned}$$

(13 marks)

(Total = 25 marks)

Question 3

a. Differentiate each of the following function with respect to x. Simplify the answer.

i. $y=\left(2x^2+4x+1\right)\left(x^3-2x+2\right)$ (4 marks)

ii. $y=\dfrac{\sqrt{3x}+2}{2x}$ (6 marks)

b. Given $y=\dfrac{\left(x^2+3\right)^2}{(2x+1)^4}$.

i. Find the slope of the curve. Simplify your answer. (8 marks)

ii. Find an equation of the tangent line at $x=1$. (7 marks)

(Total = 25 marks)

Continued...

Question 4

a. Evaluate each of the following integral:

i. $\int \left(\frac{3x^3}{2} - \frac{5}{x^2}\right)^2 + 7\pi \; dx$ (5 marks)

ii. $\int 2(5x^2 - 1)(5x^3 - 3x)^{\frac{3}{2}} \; dx$ (5 marks)

iii. $\int_1^{64} \frac{\sqrt{x} - 2}{\sqrt[3]{x}} \; dx$ (7 marks)

b. The number of motor vehicles per thousand people in a large city has changed at a rate approximated by

$$V'(x) = -2.4x^2 + 32x - 85, \qquad (3 \le x \le 10),$$

where $x = 3$ corresponds to the year 2003. There were 202.4 motor vehicles per thousand people in the city in 2003.

i. Find the function $V(x)$ in year x. (6 marks)

ii. Find the number of motor vehicles per thousand people in the city in **2010**. (2 marks)

(Total = 25 marks)

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